

JUSTIFICATION FOR OTHER THAN FULL AND OPEN COMPETITION (JOFOC)

- 1. This document is a justification for other than full and open competition prepared by NASA's Goddard Space Flight Center (NASA's GSFC).**

- 2. The nature and/or description of the action being approved:**

NASA's GSFC proposes to enter into a contract with the University of Michigan/Space Physics Research Laboratory (SPRL). This document justifies the determination for using other than full and open competition.

NASA's GSFC proposes to enter into a sole-source contract with the University of Michigan/SPRL to continue the services of SPRL as a team member for the Phase B/C/D portion of the Neutral Mass Spectrometer (NMS) instrument development for the 2012 Lunar Atmosphere and Dust Environment Explorer (LADEE) mission. The 2012 LADEE is the next major NASA mission to explore the fragile atmosphere of the Moon in preparation for human exploration. SPRL will provide the components and services listed in Section 3 of this JOFOC.

- 3. Description of the supplies or services required, including an estimated value:**

The NMS requires a number of specialized components (stable electron gun emission controllers, detector high voltage supply, high quality factor (Q) radio frequency (RF) supply for the quadrupole analyzer, rapidly switched electrode voltage supplies, and an instrument controller) with a high degree of maturity that can be rapidly developed under an aggressive instrument development schedule for the LADEE mission. The electronic components have strict requirements on volume envelope, power consumption, radiation tolerance, and compatibility with the mass spectrometer provided by NASA Goddard. The mass spectrometer to be used in this mission is the Engineering Unit of the Comet Nucleus Tour (CONTOUR) Neutral Gas and Ion Mass Spectrometer (NGIMS). SPRL shall provide the personnel, equipment, and facilities to provide: (1) digital electronic designs, fabrication, assembly, test, and system integration of the NMS instrument controller and analog electronics controller, (2) analog electronic layout, fabrication, assembly, test, and system integration for the high voltage power supplies and filament emission regulator, (3) support on the high Q RF quadrupole analyzer circuit development and test, and (4) electrical systems engineering support to insure that the electronics developed at NASA's GSFC and SPRL fully meet the NMS and mission requirements. The proposed contract will have an estimated 3-year period of performance, based on a planned launch date of April 2012. [REDACTED]

- 4. Statutory authority permitting other than full and open competition:**

The authority for this procurement is 10 U.S.C. 2304 (c)(1), Only One Responsible Source.

5. A demonstration that the proposed contractor's unique qualifications or the nature of the acquisition requires use of the authority cited:

The following rationale demonstrates the unique qualifications of SPRL to provide the necessary components and services to support the NMS development.

SPRL will provide (Q) (RF) electronics, analog and digital electronics, electrical systems engineering support, digital electronic designs, fabrication, assembly, test, and system integration of the NMS digital controller and analog electronics controller. Additionally, they will provide analog electronic layout, fabrication, assembly, test, and system integration for the high voltage power supplies and filament emission regulator.

In order to meet the stringent schedule and technical requirements of the LADEE mission, the SPRL will provide significant elements of the electronics and provide engineering services on other elements of the electronics that are to be developed in-house at NASA's GSFC. The development of the LADEE NMS leverages strongly from both the CONTOUR electronics development and from electronics development for the Sample Analysis at Mars (SAM) mass spectrometer developed for the Mars Science Laboratory (MSL) mission. The SPRL provided significant elements of the electronics and engineering services for these instruments. With the highly constrained development schedule and the specialized nature of the electronics development, SPRL is the only known vendor that can meet this requirement within the LADEE NMS schedule and budget constraints. With over 30 years of 'corporate knowledge' residing at SPRL for performing similar work as required for LADEE, any other vendor would have to spend several months in learning about the designs of previous instruments on which the LADEE design is based. They would also have to spend a considerable amount of time in learning about the complex interactions and interfaces between the mass spectrometer, the in-flight calibration system, the QMS to electronics interface and the mechanical structures and spacecraft interfaces in order to be on the same level as SPRL. The amount of time required for another vendor to acquire such knowledge would be prohibitive and would cause schedule delays which would prevent the LADEE NMS team from meeting the critical Instrument Preliminary Design Review (PDR) scheduled for September 15, 2009, and the Instrument Critical Design Review (CDR) scheduled for February 8, 2010. This 4 ½ month time period between PDR and CDR to complete the final design package could not be achieved by a new vendor. These schedules for PDR and CDR are essential for meeting the April 2012 launch date established by NASA Headquarters.

In comparison, CONTOUR had an 8 month time period between PDR and CDR and the CONTOUR digital and analog electronics were nearly a clone of the electronics used for the Cassini Orbiter mission which was also designed by SPRL. The time period between PDR and CDR for SAM (with digital and analog electronics designed by SPRL from which LADEE NMS is largely based) was 1 year which is still less than what is normally required for a typical planetary missions. For instance, the time period between PDR and CDR for the Cassini Orbiter main electronics box was 2 years with a 1 year time period prior to PDR for the preliminary design to occur. SPRL is uniquely qualified to ensure the required work is completed in the very short time period allowed in the LADEE schedule.

The high voltage power supplies and filament emission regulator are two of the most complex packaging designs in the electrical systems for NMS and require a large number of electronic elements with substantial mass. The baseline mass budget for the LADEE instrument suite of which NMS is a part, is already highly constrained with very little margin. Design and packaging requirements for the high voltage power supplies and filament emission regulators are needed to ensure that ample consideration of packaging and weight issues are addressed early in the program. SPRL has been dealing with and solving similar design and packaging constraints most specifically in the SAM and NGIMS projects on which this electronics development is based. In addition, SPRL has been involved in the application of the high Q RF analyzer electronics. Although development of this circuit will take place at NASA's GSFC, SPRL personnel are highly experienced in the application of this difficult type of circuit to a quadrupole mass spectrometer. SPRL has been involved in the development of this circuit type through several iterations of improvements for the following instruments: the Pioneer Venus Orbiter Neutral Mass Spectrometer; the Galileo Probe Mass Spectrometer; the Cassini/Huygens Gas Chromatograph Mass Spectrometer; the Cassini Orbiter Ion and Neutral Mass Spectrometer; the CONTOUR Neutral Gas and Ion Mass Spectrometer; the Nozomi Neutral Mass Spectrometer; and the Sample Analysis at Mars Quadrupole Mass Spectrometer (QMS). SPRL support regarding stability of this highly specialized circuit will be essential for the successful development of the LADEE NMS.

Many of SPRL's electronic designs can either be directly used, or at a minimum can be modified to reflect NMS's requirements. The NMS QMS is strongly based upon the mass spectrometer provided for the CONTOUR mission in 2001 with the main difference being the shape of the sensor housing which does not affect the design of the electronics. For example, critical internal NMS QMS electronic components such as the electron impact ionization parts, quadrupole switching lenses, ion lenses, quadrupole mass analyzers, and detector electronics will be modified versions of their counterparts on the mass spectrometer on the CONTOUR or MSL missions, for which SPRL provide the electronic components and support.

In sum, only the digital and analog electronics elements designed and developed by SPRL are able to satisfy the highly constrained development schedule and baseline mass budget for the LADEE instrument suite.

6. Description of the efforts made to ensure that offers are solicited from as many potential sources as practicable, including whether a notice was or will be publicized as required by FAR 5.202:

Notice of intent to award a noncompetitive contract to SPRL was advertised in the Federal Business Opportunities (FedBizOpps) and NASA Acquisition Internet Service (NAIS) in accordance with Subpart 5.2. See paragraph 10 for results.

7. A determination by the contracting officer (CO) that the anticipated cost to the Government will be fair and reasonable:

By signature on this document, the CO determines that the anticipated cost to the Government will be fair and reasonable based on a thorough evaluation of SPRL proposal. The NMS project will perform a comprehensive evaluation of SPRL's proposal to ensure that the number of hours, skill mix, materials, other direct costs (ODC) are fair and reasonable. Since SPRL has been used by NASA's GSFC before on previous flight missions and are supplying similar components and services for the NMS instrument, costs for components and services used on these previous missions will be used for comparison where applicable. After the work is authorized, NASA GSFC's Contracting Officer's Technical Representative will monitor performance. SPRL will be required to submit both technical progress and financial management reports for review and analysis by the Government. The cognizant audit agency will also review all costs incurred for allowability.

8. Description of the market research conducted, and the results, or a statement of the reasons market research was not conducted:

A formal market survey was not conducted; however, a very similar procurement was synopsized previously on the NAIS and FedBizOpps to ensure that any other potential offerors had the opportunity to express their interest in proposing to meet the requirements for the very similar SAM Instrument Suite. No responses were received.

The expertise required for manufacturing the components and providing the services needed for the NMS are unique, and specialized experience is required to design, develop, and build them. Based on NASA GSFC's engineering knowledge of the market that goes back more than 30 years in participating in similar missions, it is felt there is no other viable source that could readily participate in development of the NMS components and services required here. Members of the project team, however, have always been alert for any vendor that may be able to provide similar electronics support. Contacts are maintained with other research groups, universities, and manufacturers during meetings, trade shows, etc. who might provide acceptable, low risk alternatives. To date, no alternate domestic source has been identified.

9. Other facts supporting the use of other than full and open competition:

Previous experience with components and services needed for space flight mass spectrometers and gas chromatograph mass spectrometers has demonstrated that unique experience and expertise is required to properly design, develop, test, assemble, qualify and deliver these highly specialized components. This experience and expertise requires years of effort to develop and cannot be captured or developed by another vendor within the tight LADEE schedule constraints. The above described level of experience, which has been demonstrated by SPRL in this specialized area is unique to SPRL.

Selecting another source for these requirements would result in unacceptable risks posed by a vendor that had not designed, built, and tested space flight qualified electronic components used in the NGIMS instrument on the CONTOUR mission and in the mass spectrometer for

the SAM instrument suite on the MSL mission. Since the electronic components for the NMS instrument will be strongly based on their counterparts on NGIMS and the mass spectrometer for SAM, use of the same vendor (SPRL) that supplied the NGIMS and SAM mass spectrometer electronic components and support represents the only viable path toward complying with an aggressive LADEE schedule (launch date April 2012). The risks posed by a vendor other than SPRL may result in significant schedule delays that may jeopardize the overall LADEE mission and negate any advantage gained by utilizing the competitive procurement process. Additionally, given the specialized nature of this requirement and the fact that there were no responses to a previous procurement synopsis, the chances of receiving competitive proposals are highly unlikely for this procurement.

10. Sources, if any, that expressed an interest, in writing, in the acquisition:

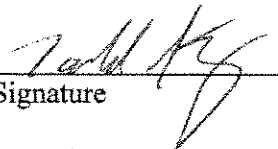
Notice of intent to award a noncompetitive contract to SPRL was advertised on May 22, 2009 in the FedBizOpps in accordance with Federal Acquisition Regulation Subpart 5.2. In addition, a synopsis was issued on the NAIS in order to inform potential sources of NASA's intent to award this effort to SPRL and to provide them with the opportunity to be considered based on their qualifications and capabilities. No responses were received to the synopsis.

11. The actions the Agency may take to remove or overcome any barriers to competition before any subsequent acquisition for the supplies or services required:

SPRL is the only known source with the necessary expertise and capability that meets the Government's requirement. A subsequent acquisition of similar components and services in support of the NMS instrument is not anticipated. Should a similar requirement develop in the future, it will be synopsized and competed to the maximum extent practical.

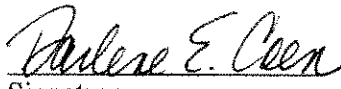
JOFOC Signature Page for Lunar Atmosphere and Dust Environment Explorer (LADEE) mission

TECHNICAL DIRECTORATE: I certify that the facts presented in this justification are accurate and complete.


Signature

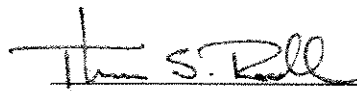
6/16/09
Date

CONTRACTING OFFICER: I certify that this justification is accurate and complete to the best of my knowledge and belief.


Signature

6/17/09
Date

for PROCUREMENT OFFICER:
(CONCURRENCE)


Signature

6/29/09
Date

GSFC COMPETITION
ADVOCATE:
(APPROVAL)


Signature

6/30/09
Date